Interim Agricultural BMP Definitions and Effectives Values
Chesapeake Bay Program Phase 5.3 Modeling Suite
August 20, 2010

The following interim agricultural BMP definitions and associated Phase 5.3 placeholder effectiveness values have been proposed and accepted by the Chesapeake Bay Program Office on a provisional basis for use in the development of Bay TMDL Watershed Implementation Plans (WIPs) by the jurisdictions. The Scenario Builder input decks posted at ftp://ftp.chesapeakebay.net/Modeling/phase5/Phase53 Load-Acres-BMPs/ on Agust 20, 2010 have been updated to include these practices and the appropriate land uses.

Although these interim BMPs have been developed in conjunction with available scientific information, supporting documentation has typically been incomplete. Thus, the interim definitions and placeholder effectiveness values are subject to change prior to being formally adopted by the partnership. In order for the jurisdictions to include future implementation of these practices towards achieving their TMDL goals through their annual progress reports or their two-year milestones reports, these interim BMPs will have been required to receive approval by the CBP partnership. The process adopted by the Water Quality Goal Implementation Team (WQGIT) on March 15, 2010 for reviewing and approving new BMPs is addressed in the *Protocol for the Development, Review and Approval of Loading and Effectiveness Estimates for Nutrients and Sediment Controls in the Chesapeake Bay Watershed Mode* document.

Interim Agricultural BMPs

1. **Cropland Irrigation Management**
   Cropland under irrigation management is used to decrease climatic variability and maximize crop yields. The potential nutrient reduction benefit stems not from the increased average yield (20-25%) of irrigated versus non-irrigated cropland, but from the greater consistency of crop yields over time matched to nutrient applications. This increased consistency in crop yields provides a subsequent increased consistency in plant nutrient uptakes over time matched to applications, resulting in a decrease in potential environmental nutrient losses.

   The current placeholder effectiveness value for this practice has been proposed at 4% TN, 0%TP and 0%TSS, utilizing the range in average yields from the 2002 and 2007 NASS data for irrigated and non-irrigated grain corn as a reference. The proposed practice is applied on a per acre basis, and can be implemented and reported for cropland on both lo-till and hi-till land uses that receive or do not receive manure.

2. **Cropland Drainage Phosphorus-sorbing Materials (PSMs)**
   The University of Maryland and the USDA Agricultural Research Service (ARS) have demonstrated through an existing research project at the University of Maryland-Eastern Shore the application of "Phosphorus-sorbing" materials to absorb available dissolved phosphorus in cropland drainage systems for removal and reuse as an agricultural fertilizer. These in-channel engineered systems can capture significant amounts of dissolved phosphorus in agricultural drainage water by passing them through phosphorus-sorbing materials, such as gypsum, drinking water treatment residuals, or acid mine drainage residuals.

   The current placeholder effectiveness value for this practice has been proposed at 0% TN, 40%TP and 0%TSS, utilizing a conservative estimate in phosphorus removal measured by the UMD/ARS research project as a reference. The proposed practice is applied on a per acre basis, and can be implemented and reported for cropland on both lo-till and hi-till land uses that receive or do not receive manure. Based upon the documentation, the proposed practice is currently limited to Coastal Plain soils with shallow groundwater levels requiring drainage ditches for agricultural production.

3. **Liquid Manure Injection**
   The subsurface of liquid manure from cattle and swine has been demonstrated in research studies to significantly reduce nutrient losses for both surface runoff and ammonia emissions. Recent studies by Pennsylvania State University (PSU) and USDA-ARS indicate that the effectiveness of the practice is dependent on the technology used for injection, and that some systems are not consistent with the USDA-NRCS management requirements for high residue management systems; e.g. Continuous No-Till. This proposed practice is indicative of low disturbance soil injection systems and is not appropriate for tillage incorporation or other post surface application incorporation methods.

   The current placeholder effectiveness value for this practice has been proposed at 25% TN, 0%TP and 0%TSS, utilizing a conservative estimate in combined nutrient and sediment loss reductions by current university and ARS research as a reference. The proposed practice is applied on a per acre basis, and can be implemented and reported for cropland on both lo-till and hi-till land uses that receive manure, pasture and hay with manure.

4. **Poultry Manure Injection**
   The subsurface injection of poultry manure has been demonstrated in university and USDA-ARS research studies to significantly reduce nutrient losses for both surface runoff and ammonia emissions. Recent studies by universities and USDA-ARS indicate that dry manure injection is feasible and effective by utilizing current research technology. These systems are also consistent with the USDA-NRCS management requirements for high residue management systems; e.g. Continuous No-Till. This proposed practice is indicative of low disturbance soil injection systems and is not appropriate for tillage incorporation or other post surface application incorporation methods.

   The current placeholder effectiveness value for this practice has been proposed at 25% TN, 0%TP and 0%TSS, utilizing a conservative estimate in combined nutrient and sediment loss reductions by current university and ARS research as a reference. The proposed practice is applied on a per acre basis, and can be implemented and reported for cropland on both lo-till and hi-till land uses that receive manure, pasture and hay with manure.

   Mortality Incineration
   The definition of the approved BMP entitled *Mortality Composting* does not include the alternative process of incineration practiced by some livestock operations. The proposed interim practice of Mortality Incineration is defined as a physical structure and process for disposing of dead livestock and poultry through incineration versus composting. The resulting ash material is land applied using nutrient management plan recommendations.

   The current placeholder effectiveness value for this practice has been proposed at 40% TN, 10%TP and 0%TSS, utilizing the existing Mortality Composting effectiveness estimate as a reference. The proposed practice is applied on a livestock type and operation basis, and can be implemented and reported for the AFO land use.

5. **Vegetative Environmental Buffers (VEB)**
   A vegetative environmental buffer, or VEB, is the strategic dense planting of combinations of trees and shrubs around poultry houses to address environmental, production, and public relations

issues. Research conducted by the University of Delaware have indicated that mature tree plantings can offer filtration benefits for poultry operations by entrapping dust, odor, feathers, and noise emitted by air exhaust from ventilation systems. Documentation on the effectiveness of VEB's in reducing nitrogen losses to the environment through ammonia emission reductions is currently non-conclusive.

The current placeholder effectiveness value for this practice has been proposed as a land use change for the area directly planted to trees and shrubs. The proposed practice is applied on a per acre basis, and results in a conversion to forest land from cropland, on both lo-till and hi-till land uses that receive manure or do not receive manure, pasture or hay land with or without nutrients.